MARKANOV, N. A.

MARKANOV, N. A. -- "Penoganch' (foamed gypsum-clay stucco binder?)." Inst of Structures, Acad Sci Uzbek SSR. Tashkent, 1955. (Dissertation for the Degree of Candidate of Technical Sciences.)

SO: Knizhnaya letopis', No. 4, Moscow, 1956

MARKANOV, N.A., kand.tekhn.nauk

Testing and controlling properties of lightweight materials and concrete mixes. Bet. i zhel.-bet. no.6:231-232 Je '58. (MIRA 11:6)
(Lightweight concrete)

MARKANOV, N.A.

Problem of improving the properties of foam. Izv.AN Uz.SSR. Ser.tekh.nauk no.1:45-50 '60. (MIRA 13:6)

1. Sredneaziatskiy politekhnicheskiy institut.
(Foam)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001032410010-9"

MARKAREVICH, U. (Brestskaya voblasst')

The joy of work. Rab. i sial. 34 no.5:6-7 My '58. (MIRA 11:6)
(Drogichin District--Swine--Feeding and feeding stuffs)

MARKARIAN, M.

Contamination of water resources by radioactive materials and sanitation problems in the water supply. Tr. from the Russian. p. 131. VODNI HOSPODARSTVI. (Ustredni sprava vodniho hospodarstvi) Praha. No. 5, 1954.

SOURCE: East European Accessions List, (EEAL). Library of Congress. Vol. 5 no. 12, December 1956

MARKAROV, A.V., gornyy inzh.

Use of the TM-1,75 boring unit for drilling holes. Ugol' 37 no.11:42-43 N '62. (MIRA 15:10)

1. Trest Tulshakhtoosusheniye.
(Rock drills) (Mine ventiliation)

MARKAROV, G.

PA 16T7

USSR/Fire Extinguishing Agents Jul/Aug 1946
Spraying apparatus

"Extinguishing Oil Fires by Means of Atomized Water Spray," G. Markarov, 4 pp

"Mor Flot" No 7/8

Partly mathematical discussion. Mentions that in choosing spraying equipment it is important to investigate not only the rate of flow per second but also the diameter of the area covered by the spray.

16T7

Markarov, G Ye

Sudovyye sistemy teplosnabzheniya s [illegible] vody (Ship heat supply systems with natural circulation of water) Moskva, Morskoy Transport, [illegible]
127 p. Diagrs., Tables.
"Literatura": p. (126)

PROCESSES AND PROPERTIES INDEX

9

CA

The operation of Venturi heads. P. M. Maskovskii and G. I. Makarov. *Stal* 3, No. 3/4, 20-2(1943).—The performance of Venturi heads in blast furnaces is discussed.

M. Hoch

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001032410010-9"

KHUDOBKO, N.L.; MAKAROV, G.I.

Impulse measurements in a band amplifier. Vest.Len.un. 9 no.11:95-98 N '54. (MIRA 8:7)

(Amplifiers, Vacuum-tube)

MAKAROV, G.I.

USSR/Physics - Band-pass cascade amplifiers

Card 1/1 Pub. 127 - 8/12

Authors : Khudobko, N. L., and Makarov, G. I.

Title : Regarding the question on intermediate processes in a band by-pass amplifier

Periodical : Vest Len. un ser. mat. fiz. khim. 5, 101-118, May 1955

Abstract : A derivation of a practical formula for the determination of forms and other characteristics of the output signals of the band-pass cascade amplifiers is presented. The method of a stationary phase is considered as the best method for the derivation of this asymptotic formula used in studying intermediate processes of multi-cascade amplifiers. One USSR reference (1948). Tables; photograms; graphs; diagrams.

Institution : .....

Submitted : May 8, 1954

MAKAROV, G. I.

USSR/ Physics

Card 1/1 Pub. 127 - 6/13

Authors : Smurova, N. A., and Makarov, G. I.

Title : Impulse measurements in a rhoostat amplifier

Periodical : Vest. Len. un. Ser. mat. fiz. khim. 10/2, 107-124, Feb 1955

Abstract : An impulse method is presented (method of characteristic points) for the measurement of time constants of an n-cascade rheostat amplifier. The applicability of the new method is described. One USSR reference (1948). Tables; graphs.

Institution : ....

Submitted : May 13, 1954

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001032410010-9"

SOV/54-58-3-5/19

AUTHORS: Krasil'nikov, V.N., Makarov, G.I.

TITLE: Transient Processes in Linear Vibrators (Nestatsionarnyye protsessy v lineynykh vibratorakh)

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1958, Nr 3, pp 27 - 50 (USSR)

ABSTRACT: The present paper is a part of the dissertation written by V.N. Krasil'nikov. G.I. Makarov suggested the problem and helped clarify a number of questions. The authors investigated transient processes in thin aerials. Paragraph 1 deals with the problems arising in the theory of thin aerials. Although the basic investigations on the steady theory of thin aerials have been published already some time ago (Refs 1,2) discussions arose in Soviet and American technical publications (Refs 4-8), dealing with the formulation of the integral equation for an aerial with a so-called gap. The transient excitation of a thin cylindric aerial (§ 2) as well as transient current waves in the aerial (§ 3) were investigated. From the practical point of view 2 facts are of particular importance in the investigation of transient processes in various systems: 1) the behaviour of the system during the initial moments, especially the investigation of the first half waves of

Card 1/3

the signal, 2) the characteristic of the process as a whole and the determination of the time after the lapse of which the system becomes steady. Paragraph 3 gives the answer to the first question. The current in the direct and in the once reflected wave was found in the first approximation. Transient distortions were found only in a small domain around the front. These transient phenomena which depend on the diameter of the aerial must be considered in the examination of the signal front. As regards the second problem, it appears that from principal considerations repeatedly reflected waves must be investigated and the constantly increasing transient process in the range of the front has to be considered. In the case of thin aerials the real transient process can be assumed asymptotic. In the case of an arbitrarily thin aerial the transient distortions in the range of the travelling wave front are completely absent. As the radius of the aerial is insignificantly small, it can be assumed that the transient characteristic impedances introduced in § 3 adopt their definite values $Z(z)$ from the very beginning. For this reason the coefficient of reflection on steady as well as on transient conditions differs only little from (-1) and can be replaced by the steady formula $K_o e^{2i\delta_o}$. The interaction of the reflected waves with the generator must be considered as well. This is possible if the considerations are started from the simplest quasisteady case. The summation of all travelling waves must yield the steady conditions in the vibrator. According to the suggested method transient processes in thin aerials can be thoroughly investigated also on the occasion of more complicated cases. The analysis does not become too voluminous if in the case of a sufficiently low ratio $\frac{a}{l}$ two basic classes of transient processes in aerials which are determined by the longitudinal and transverse dimensions are investigated separately. The transient phenomena in the field of the aerial (above all in the distant zone) can also easily be investigated. Work on these calculations is under way. There are 7 figures and 22 references, 12 of which are Soviet.

SUBMITTED: March 5, 1958

KRASIL'NIKOV, V.N.; MAKAROV, G.I.

Nonsteady processes in linear antennas [with summary in English]. Vest.LGU 13 no.16:27-50 '58. (MIRA 11:11)
(Antennas (Electronics))

MAKAROV, G. I.

16(1) PHASE I BOOK EXPLOITATION SOV/2660

Vsesoyuznyy matematicheskiy s"yezd. 3rd, Moscow, 1956

Trudy. t. 4: Kratkoye soderzhaniye sektsionnykh dokladov. Doklady inostrannykh uchenykh (Transactions of the 3rd All-Union Mathematical Conference in Moscow. vol. 4: Summary of Sectional Reports. Reports of Foreign Scientists) Moscow, Izd-vo AN SSSR, 1959. 247 p. 2,200 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Matematicheskiy institut.

Tech. Ed.: G.N. Shevchenko; Editorial Board: A.A. Abramov, V.G. Boltyanskiy, A.M. Vasil'yev, B.V. Medvedev, A.D. Myshkis, S.M. Nikol'skiy (Resp. Ed.), A.G. Postnikov, Yu. V. Prokhorov, K.A. Rybnikov, P. L. Ul'yanov, V.A. Uspenskiy, N.G. Chetayev, G. Ye. Shilov, and A.I. Shirshov.

PURPOSE: This book is intended for mathematicians and physicists.

COVERAGE: The book is Volume IV of the Transactions of the Third All-Union Mathematical Conference, held in June and July 1956. The book is divided into two main parts. The first part contains summaries of the papers presented by Soviet scientists at the Conference that were not included in the first two volumes. The second part contains the text of reports submitted to the editor by non-Soviet scientists. In those cases when the non-Soviet scientist did not submit a copy of his paper to the editor, the title of the paper is cited and, if the paper was printed in a previous volume, reference is made to the appropriate volume. The papers, both Soviet and non-Soviet, cover various topics in number theory, algebra, differential and integral equations, function theory, functional analysis, probability theory, topology, mathematical problems of mechanics and physics, computational mathematics, mathematical logic and the foundations of mathematics, and the history of mathematics.

~~Makarov, G.I.~~ (Leningrad), V.S. Buldyrev (Leningrad), ~~E.M. Grunninen~~ (Leningrad), ~~I.A. Molotkov~~ (Leningrad). Quantitative study of the nonstationary diffraction of waves from spherical and cylindrical regions	120
~~Pomeranchuk, I.Ya.~~ (Moscow). The turning to zero of renormalized charges in theories with point interaction	120
Rumer, Yu.B. (Novosibirsk). Five-dimensional optics	120
~~Skuridin, G.A.~~ (Moscow). On the theory of the reflection of elastic waves from a curvilinear boundary	122
~~Stanyukovich, K.P.~~ (Moscow). Relativistic mechanics and the electrodynamics of continuous media	122
Khodzhayev, L.Sh. (Stalinabad). Singular functions of quantum field theory in n-dimensional pseudo-Euclidean space	124

Card 23/34

YELIZAROV, B.V.; KRYLOV, G.N.; MAKAROV, G.I.

Asymptotic methods for the calculation of transients in low-frequency filters. Radiotekhnika 14 no.2:63-69 F '59. (MIRA 12:1)
(Radio filters)

69908
S/109/60/005/04/023/028
E140/E435

9,1000

AUTHORS: Krylov, G.N. and Makarov, G.I.

TITLE: Attenuation Functions of the Electromagnetic Fields of a Vertical Dipole and a Vertical Antenna

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol 5, Nr 4, pp 684-688 (USSR)

ABSTRACT: Approximate expressions are obtained for calculating the electromagnetic field components of a vertical dipole located at an arbitrary point in space and a vertical antenna with radiation directed along the surface of the earth. The results of numerical calculations at a frequency of 1 Mcs for earth parameters $\varepsilon = 9$, $\sigma = 5 \times 10^{-3}$ mho/m are presented graphically. There are 4 figures and 4 references, 1 of which is Soviet, 2 English and 1 English in Russian translation.

ASSOCIATION: Fizicheskiy fakul'tet Leningradskogo gosudarstvennogo universiteta im. A.A.Zhdanova (Physics Department, Leningrad State University imeni A.A.Zhdanov)

SUBMITTED: May 18, 1959

Card 1/1

KRYLOV, G.N.; MAKAROV, G.I.

Structure of the electromagnetic field of a vertical electric dipole and a vertical antenna in space over flat earth. Vest. LGU 15 no.16: 42-46 '60. (MIRA 13:8)
(Electromagnetic waves) (Antennas (Electronics))

S/109/61/006/005/005/027
D201/D303

-6,4700
9.9000 (1103)

AUTHORS: Novikov, V.V., and Makarov, G.I.

TITLE: Propagation of pulse signals over a plane homogeneous earth surface

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 5, 1961, 728 - 737

TEXT: J.R. Wait (Ref. 1: Canad. J. Phys., 1956, 34, 27) and J.R. Johler (Ref. 2: Geofis. pura e appl. 1957, 37, 116) and (Ref. 3: J. Res. Nat. Bur. Standards 1958, 60, 281) in their work on the propagation of non-stationary radio waves, to which increasing attention is being paid lately, have given the theory of propagation of pulse signals over a plane homogeneous earth surface, neglecting the influence of the displacement current. This could be valid only for signals with strong low-frequency components of the spectrum and propagated over the earth with very good or medium conductivity which does not always happen in practice. In the pre-

Card 1/12

sent article the author analyses the problem of a non-stationary propagation of radiowaves, radiated from a vertical electric dipole over a plane homogeneous earth surface and takes into account the displacement currents in the earth. Depending on the dipole current characteristics, the solution reduces to either elementary functions or to the probability integral of a complex argument. The mechanism of non-stationary phenomena in radio-wave propagation is also explained. Let the radiator be a vertical electric dipole, situated at a plane homogeneous earth surface having conductivity σ and the relative specific inductive capacitance ϵ_m; the dipole is excited by current I(t), I(t) = 0 for t < 0. The vertical component of the electric field at the surface of the earth is determined for such dipole (in MKS system of units) by

$$E = \frac{\cdots}{\cdots}\,\cdots\,(\sqrt{\cdots})\,e^{\cdots}, \qquad (1)$$

where $\mu = 4\pi \cdot 10^{-7}$ H/m; I - amplitude of current in the dipole;

dh - height of dipole: $sr = ikr/2\ (\varepsilon_m' + 1)$ numerical distance; $\varepsilon_m' = \varepsilon_m + i\frac{\sigma}{\omega\varepsilon_0}$ the relative complex specific inductive capacitance of the earth; w(x) is given by

$$w(x) = 1 + 2xe^{-x^2}\int_x^{i\infty} e^{z^2}dz \qquad (2)$$

which is the Sommerfeld attenuation function. If in (1) the expression under the sign of I represents the current spectrum in the dipole:

$$I = I(\omega) = \int_0^\infty I(t)\,e^{i\omega t}dt,$$

then it would represent the spectrum of the vertical component of the electric field, and its integral with respect to the frequency gives the solution for the non-stationary problem for this component.

$$E(t') = \frac{i\mu dh}{4\pi^2 r} \int_{-\infty+i\varepsilon}^{\infty+i\varepsilon} \omega w(\sqrt{sr})\, I(\omega)\, e^{-i\omega t'} d\omega; \quad t' = t - \frac{r}{c}. \tag{3}$$

In analyzing the frequency characteristics as a function of attenuation, ω is replaced by a dimensionless parameter $\alpha\omega$ where

$$\alpha = \sqrt{\frac{8\sigma r}{2\pi c}}. \tag{4}$$

then the numerical distance can be represented as

$$sr = \frac{(\alpha\omega)^2}{i(1 - i\gamma\alpha\omega)}, \qquad \gamma = \frac{\varepsilon_m + 1}{\sqrt{60\,\pi\sigma}}. \tag{5}$$

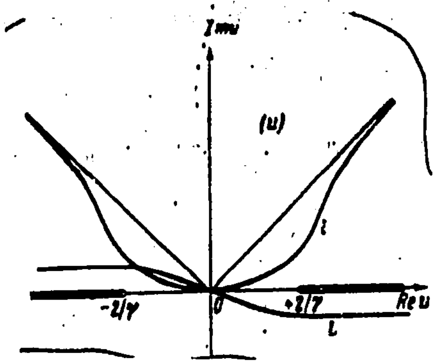
When displacement currents are taken into account, γ as defined by Eq. (5) is not zero and for real soils at distances larger than 5 - 10 Km is less than unity. Calculations have shown that for cases when $\gamma < 1$ displacement currents reduce the passband of the propagation track. From the evaluation of integral of Eq. (3) a comparatively simple expression

$$E_1(t') = -\frac{i\mu I_a dh}{2\pi\sqrt{\pi a r}} \int_L u C'(u) e^{-u^2 - 2i\theta(u) T} du, \tag{12}$$

can be obtained, the integration path of which is shown in Fig. 2

Fig. 2. The plane of complex variable (u).

Fig. 2.



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Propagation of pulse ...

and in which u is given by

$$u = \sqrt{sr} = \frac{\alpha\omega}{\sqrt{1 - \frac{i\omega}{\xi}}}, \tag{7}$$

and T and $\vartheta(u)$ by

$$T = \frac{t'}{2\alpha}; \quad \vartheta(u) = u\left(\sqrt{1 - \frac{T^2u^2}{4}} - \frac{i\gamma u}{2}\right), \tag{9}$$

If the dipole is excited by a unit step pulse with either sine or cosine carrier, the stationary part of the field can be derived as

$$E_{z\,st}(t') = \frac{i\omega_0\mu I_0\,dh}{2\pi r} w\left(\sqrt{s_0 r}\right) e^{-i\omega_0 t'} \tag{13}$$

and its non-stationary part describing transient processes, as

$$E_{z\,nonst}(t') = -\frac{i\mu I_0'\,dh}{2\pi\sqrt{\pi\alpha r}} \int_L \frac{u\vartheta(u)\,\vartheta'(u)}{\vartheta(u) - \alpha\omega_0} e^{-u^2 - 2i\vartheta(u)T}\,du \tag{14}$$

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Introducing into (12) and (14) change of variable p = γu/2,

$$E_1(t') = -\frac{\mu I_a dh}{2\pi r}\frac{4i\zeta^2\alpha}{\sqrt{\pi}}\int_L pu'(p)\exp\left[-2\frac{\zeta}{\beta}f(p)\right]dp, \quad (15)$$

and

$$E_{1\,\text{nonstat.}}(t') = -\frac{\mu I_a dh}{2\pi r}\frac{4i\zeta^2\alpha}{\sqrt{\pi}}\int_L \frac{pu(p)u'(p)}{u(p)-a}\exp\left[-2\frac{\zeta}{\beta}f(p)\right]dp, \quad (16)$$

are obtained, where

$$u(p) = p(\sqrt{1-p^2}-ip); \quad f(p) = p^2 + i\tau u(p); \quad a = \frac{\omega_0}{2\zeta};$$

$$\tau = \beta t'; \quad \beta = \frac{(e_m+1)c}{r}. \quad (17)$$

By applying the method of stationary phase Eqs. (15) and (16) become

$$E_1(t') = -\frac{\mu I_a dh}{2\pi r}\zeta F(\tau)\exp\left[-\frac{\zeta}{\beta}f(\tau)\right]\left\{\tau + \frac{\beta}{\zeta}u(\tau)\right\}, \quad (18)$$

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and

$$E_{z\,\text{nonstat.}}(t') = -\frac{\mu I_a\, dh}{2\pi r} F(\tau) \exp\left[-\frac{\zeta}{\beta} f(t)\right] \left\{ \zeta\tau + \beta u(\tau) + i\omega_0 \varphi(\tau) \left[1 + \psi(\omega_0, \zeta, \tau)\, 2z_0 e^{-z_0^2} \int_{z_0}^{i\infty} e^{z^2} dz \right] \right\}, \quad (19)$$

where

$$F(\tau) = \frac{2}{(1+2\tau)(1+\sqrt{1+2\tau})}, \quad u(\tau) = \frac{1+\sqrt{1+2\tau}}{2\sqrt{1+2\tau}},$$

$$f(\tau) = \frac{\tau^2}{1+\tau+\sqrt{1+2\tau}}, \quad \varphi(\tau) = \frac{1}{2}[1+2\tau+\sqrt{1+2\tau}], \quad (20)$$

$$\psi(\omega_0, \zeta, \tau) = \left[1 + i\frac{\zeta}{\omega_0}\frac{\tau}{\varphi(\tau)}\right]^{-1}, \quad z_0^2 = s_0 r + i\omega_0 t' - \frac{\zeta}{\beta} f(\tau).$$

the condition of applicability of (18) and (19) being

$$2\frac{\zeta}{\beta} \gg 1. \quad (21)$$

If in (18) and (19) convection currents are neglected, the two equations are identical to those obtained by J.R. Wait (Ref. 1: Op. cit.). In order to analyze the radiation field given by Eq. (18) produced by the dipole excited by a unit step function, this equation is rewritten as

$$E_1(t') = -\frac{\mu I_a dh}{2\pi r \alpha} A(\gamma, T),$$

$A(\gamma, T) = F(\gamma T) \{T + \frac{1}{2}\gamma u(\gamma T)\} \exp[-\chi(\gamma T) T^2]$, where functions $F(\gamma T)$ and $u(\gamma T)$ are determined by formulae (20) γ and T are given by Eqs. (5) and (9) and

$$\chi(x) = \frac{2}{1 + x + \sqrt{1 + 2x}}.$$

If the dipole is excited with a HF sinusoidal or cosinusoidal step input pulse, by means of applying dimensionless variables of

$$\tau_1 = \omega_0 t', \quad \varkappa = \frac{(\varepsilon_m + 1)\varepsilon_0\omega_0}{\sigma}, \quad \rho = \alpha^2\omega_0^2.$$

$$E_z(t') = -\frac{i\omega_0\mu I_0\, dh}{2\pi r}\,|w(\sqrt{s_0 r})|\,V(\rho, \varkappa, \tau_1),$$

$$V(\rho, \varkappa, \tau_1) = -e^{i\varphi_{com} - i\tau_1} + W(\rho, \varkappa, \tau_1), \qquad (22)$$

is obtained. In it w ($\sqrt{s_0 r}$) is the Sommerfeld attenuation function. φ_{com} - its argument; and

$$W(\rho, \varkappa, \tau_1) = \frac{F(x)}{|w(\sqrt{s_0 r})|}\exp\left[-\chi(x)\frac{\tau_1^2}{4\rho}\right]\left\{-i\left[\frac{\tau_1}{2\rho} + \frac{\varkappa}{2\rho}u(x)\right] + \right.$$

$$\left. + \varphi(x)\left[1 + \psi(\rho, \varkappa, \tau_1)\, 2z_0 e^{-z_0^2}\int_{z_0}^{i\infty} e^{z^2}\, dz\right]\right\}; \qquad (23)$$

$$x = \frac{\varkappa}{2\rho}\tau_1; \quad s_0 r = \frac{\rho}{1 - i\varkappa}; \quad \psi(\rho, \varkappa, \tau_1) = \left[1 + i\frac{\tau_1}{2\rho}K(x)\right]^{-1};$$

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$$K(x)=\frac{2}{\sqrt{1+2x}\,(1+\sqrt{1+2x})};\quad z_0^2=s_0r+i\tau_1-\chi(x)\frac{\tau_1^2}{4\rho}. \qquad (23)$$

is valid for the non-stationary part of the field for the condition

$$\frac{\gamma^2}{4\rho}\ll 1$$

of the function W (Eq. 23) describes the non-stationary part of the radiation field, the real part of the function V (Eq. 22) - the total field when the dipole is excited by a current of the shape of

$$I(t)=I_a\sin\omega_0t\cdot 1(t). \qquad (24)$$

Functions ImW and ImV describe the non-stationary part and the complete field respectively when the current in the dipole has the shape given by

$$I(t)=I_a\cos\omega_0t\cdot 1(t).$$

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Graphs show that displacement currents introduce an attenuation of the amplitude of the non-stationary part of the field and that the amplitude of transients depends on the current spectrum in the dipole. From graph of ReV it is seen that transients may introduce considerable distortion in the propagated signal. It is stated in conclusion that the problem of propagation of pulse signals over the surface of the earth is also of practical interest, in that it gives the picture of signal distortion and that the results obtained could be used to solve the problem of the inverse diffraction problem and that from measurements of the delay time of the maximum of the signal, having other data available, one could determine the conductivity of the propagation path. There are 6 figures and 5 references: 2 Soviet-bloc, and 3 non-Soviet-bloc. The references to the English-language publications read as follows: J.R. Wait, Canad. J. Phys. 1956, 34, 27; J.R. Johler, J. Res. Nat. Bur. Standards. 1958, 60, 28)

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im A.A. Zhdanova, Kafedra Radiofiziki (Leningrad State University im A.A. Zhdanov, Department of Radiophysics)

SUBMITTED: March 24, 1961 Card 12/12

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001032410010-9"

KOZINA, O.G.; MAKAROV, G.I.

Transients in acoustic fields generated by a piston membrane of arbitrary shape with arbitrary surface vibrations. Akust. zhur. 7 no.1:53-58 '61. (MIRA 14:4)

1. Leningradskiy gosudarstvennyy universitet.
(Sound)

27589
S/108/61/016/010/002/006
D209/D306

9.2590

AUTHORS: Yelizarov, B.V., and Makarov, G.I.

TITLE: Transients in delay lines with a great many sections

PERIODICAL: Radiotekhnika, v. 16, no. 10, 1961, 10 - 19

TEXT: This article was read in May 1960 at the Radio-Day All-Union meeting of the Scientific and Technical Society of Radio Engineering and Electrical Communication im. A.S. Popov. The present article is a continuation of the work of the authors (Ref.1: B.V. Yelizarov, G.N. Krylov, G.I. Makarov, Radiotekhnika, vol. 14, no. 2, 1959; Ref. 2: V.B. Yelizarov, G.N. Krylov, G.I. Makarov, Radiotekhnika, vol. 14, no. 10, 1959) on the use of asymptotic methods for determining the transients in delay lines. The circuit considered in this article consists of n symmetrical identical M-type sections Fig. 2 of a low-pass filter connected in series, loaded by Z_L and excited from a voltage generator with internal resistance Z_g. The properties of such a circuit are studied by deriving its

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Transients in delay lines ...

transfer coefficients K(X)

$$K(x) = \frac{Z_L}{(Z_L + Z_g)\left[\operatorname{ch} ng + \frac{Z_c^2 + Z_L Z_g}{Z_c (Z_L + Z_g)} \operatorname{sh} ng\right]} = \frac{2 Z_L Z_c e^{-ng}}{(Z_c + Z_L)(Z_c + Z_g)(1 - q)};$$

$$q = \frac{(Z_c - Z_L)(Z_c - Z_g)}{(Z_c + Z_L)(Z_c + Z_g)} e^{-2ng}. \quad (2)$$

where Z_c, Z_L, Z_g, g - are functions of dimensionless complex frequency $x = p/\omega_0$ and ω_0 - the cut-off filter frequency, g - being the propagation constant. The stationary characteristic is found considering T - sections only and $Z_g = R_g$ and $Z_L = R_L$, so that

$$r_g = \frac{R_g}{Z_c(0)}; \quad r_L = \frac{R_L}{Z_c(0)}. \quad (4)$$

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can be introduced. K(x) can then be represented as

$$K(x) = \frac{K_0}{f_2(x)};\ f_2(x) = \operatorname{ch} ng + \frac{r_l r_g + 1 + x^2}{(r_l + r_g)\sqrt{1 + x^2}} \operatorname{sh} ng. \tag{18}$$

and the output voltage by

$$U_{out}(\tau) = \frac{1}{2\pi i} \int_{\sigma - i\infty}^{\sigma + i\infty} K(x) U_{in}(x) e^{\tau x} dx,\ \tau = \omega_0 t, \tag{19}$$

where $V_{in}(x)$ - the generalized spectrum of input voltage. The determination of the root sign in K(x) is arbitrary since after the transformation of ny perbolic functions fz(x) is represented by a polynomial of the order 2n + 1. It can also be shown that f2(x) has simple roots - and

$$\text{if } t_1 = \frac{mx}{\sqrt{1 + (1 - m^2) x^2}}, \quad \text{hence } x = \pm \frac{t_1}{\sqrt{m^2 - (1 - m^2) t_1^2}} \tag{20}$$

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where $m = \sqrt{1 - \varkappa/1 + \varkappa}$. Also

$$t_1 = \operatorname{sh} g/2 \qquad (21)$$

so that

$$\operatorname{th} ng = -\frac{\sqrt{1+x^2}\,(r_L + r_g)}{r_L r_g + 1 + x^2}.$$

of

$$g = \frac{-1}{n}\operatorname{Arth}\frac{\sqrt{1+x^2}\,(r_L + r_g)}{r_L r_g + 1 + x^2} = \frac{1}{2n} Ln \frac{(\sqrt{1+x^2} - r_g)(\sqrt{1+x^2} - r_L)}{(\sqrt{1+x^2} + r_g)(\sqrt{1+x^2} + r_L)}. \qquad (22)$$

and finally from (22), (21) and (20)

$$x = \frac{\operatorname{sh}\left[\frac{1}{4n}\left(2\pi i s - \ln\frac{(\sqrt{1+x^2} + r_L)(\sqrt{1+x^2} + r_g)}{(\sqrt{1+x^2} - r_L)(\sqrt{1+x^2} - r_g)}\right)\right]}{\sqrt{m^2 - (1 - m^2)\operatorname{sh}^2\left[\frac{1}{4n}\left(2\pi i s - \ln\frac{(\sqrt{1+x^2} + r_L)(\sqrt{1+x^2} + r_g)}{(\sqrt{1+x^2} - r_L)(\sqrt{1+x^2} - r_g)}\right)\right]}} \qquad (23)$$

$$s = 0, 1 \ldots n. \qquad ($$

is obtained. Taking the real and imaginary parts of Eq. (23), expressions of the type of

$$\alpha = f_3(\alpha, \beta); \; \beta = f_4(\alpha, \beta) \tag{24}$$

are obtained, from which α and β can be consecutively obtained. Functions f_3 and f_4 are very complicated. Their iterative expressions converge very quickly, however, , and are non critical with respect to the initial approximation, e.g. the evaluation of roots for n = 50 using the fast computer СТРЕЛА (STRELA) takes only 3 minutes. Knowing the poles of K(X) and of $U_{in}(X)$, $U_{out}(\tau)$ can be represented as

$$U_{out}(\tau) = U_{st}(\tau) + K_0\left[\frac{U_{in}(x_0)e^{\tau x_0}}{f_2'(x_0)} + 2\mathrm{Re}\sum_{s=1}^{s=n}\frac{U_{in}(x_s)e^{\tau x_s}}{f_2'(x_s)}\right], \tag{25}$$

or

$$U_{out}(\tau) = U_{st}(\tau) + \sum_{s=0}^{s=n} M_s e^{-\alpha_s \tau} \cos(\beta_s \tau + \varphi_s). \tag{26}$$

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$U_{st}(\tau)$ is the steady state solution for poles of $U_{in}(x)$ and all other terms tend to zero for $\tau \longrightarrow \infty$ and determine the transients. For convenience the constant factor U_0 can be extracted and then $U_{out}(\tau) = U_0 \cdot U_1(\tau)$ with

$$\lim_{\tau \longrightarrow \infty} U_1(\tau) = 1 \qquad (27)$$

and only the graph of $U_1(\tau)$ can be plotted. All calculations were made by the authors after programming the "Strela" computer and much numerical material has been compiled which because of the limited space could not be reproduced in the article. Only $U_1(\tau)$ for $n = 5$ is given in all figures and graphs. For larger n the reasoning remains the same but the transients become much lengthier. The graph of $U_1(\tau)$ is given for various $\varkappa$ if $r_g = r_L = 1$ with unit impulse function at the input. The values of α_s, β_s, M_s and φ_s for

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$\varkappa = 0$ are given in tabulated form. As may be seen the change in mutual inductance strongly influences the delay and the shape of the signal. If at the same time $\varkappa > 0$, the delay only varies, for $\varkappa < 0$ both the delay and the signal shape are changed. From the point of view of overshoots there exists a certain optimum value of $\varkappa$. This value is $\varkappa_{opt} \simeq -0.25$. Fig. 6 shows $U_1(\tau)$ with input signal

$$U_{in}(\tau) = \begin{cases} 0 & \tau < 0 \\ \sin \Omega_c \tau & \tau > 0 \end{cases}, \quad \Omega_c = \frac{\omega_c}{\omega_0}, \tag{28}$$

for $r_g = r_L = 1$; $\Omega_c = \omega_c/\omega_0 = 0.5$ ($\omega_0 = \frac{2}{\sqrt{LC}}$) for various $\varkappa$ and $\Omega_c = 0.2$. Curve 1 - $\Omega_c = 0.2$, $\varkappa = 0$; curve 2 - $\Omega_c = 0.5$, $\varkappa = 0.3$; curve 3 - $\Omega_c = 0.5$, $\varkappa = 0$; curve 4 - $\Omega_c = 0.5$; $\varkappa = -0.3$. With a further increase in frequency the length of transients rapidly increases and the effect of parameters begins to be felt. The characteristic shape of output signal for frequencies near the cut-off is shown. The envelope of the signal, while oscillating slowly tends to its

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steady state value and time taken depends on all parameters but mainly for $\Omega_c \rightarrow 1$. The derived exact expression (26) allow not only certain physical phenomena to be demonstrated but are also useful as a means of checking the accuracy of approximate expressions derived earlier by the authors (Refs: 1, 2: Op.cit.). The main term of

$$U_{\text{вых}}(\tau) = \frac{1}{2}\left[2n\int_0^\tau \frac{J_{2n}(t)}{t}\,dt - I_1\right]. \tag{29}$$

describes the process more accurately than the expression obtained earlier (Refs 1, 2: Op.cit.) and is handier in calculations. The case of a unit impulse input is then considered. There are 8 figures, 3 tables and 4 Soviet-bloc references [Abstractor's note: Ref. 4, although in Russian, is a translation from an English-language publication].

SUBMITTED: February 11, 1960 (initially)
December 19, 1960 (after revision)

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Fig. 2.

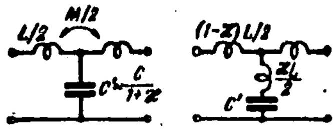

Рис. 2

Fig. 6.

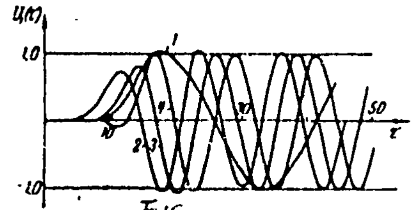

Fig. Рис. 6

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9.3260 (1139,1159)

AUTHORS: Gyunninen, E.M., Zanadvorov, P.N., Kotik, I.P., and Makarov, G.I.

TITLE: The effect of a complex shape periodic signal on a free-running oscillator

PERIODICAL: Radiotekhnika, v. 16, no. 11, 1961, 39 - 44

TEXT: The pure theory of phasing of oscillators presents difficulties which make the solutions of its problem practically impossible. In the present article, the author considers the solution of this problem in its numerical context, by means of a fast electronic computer. Such a problem, as opposed to the purely analytical one, is stated to be comparatively easy, but the quasilinear method of analysis is applied for simplification and numerical substitution of the equation of the oscillator, upon which acts the external force $A(\tau)$. If x is the voltage at the grid, reduced to the amplitude x_m of the steady state oscillations at the grid, ω_0 and δ - the frequency and attenuation of the oscillating circuit, $\tau = \omega_0 t$ - dimen-

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sionless time; $\bar{S}_{\partial}$ - average reduced slope of the valve. μ, γ, S_o and β - constants, then the fundamental equation may be represented as

$$\frac{d^2x}{d\tau^2} + x = -\mu\left\{\delta - M\omega_o S_o\left[1 - \frac{2}{\pi}\,\mathrm{arc\,tg}\,\beta x_m\right]\right\}\frac{dx}{d\tau} + \gamma A(\tau). \quad (3)$$

Practical values are now assigned to the parameters of (3) thus: $\delta = 0.8$; $M\omega_o S_o = 1.12$; $\beta = 0.422$; $\mu = 10^{-2}$ and 10^{-3}, $\gamma = 0.1$ and 0.01 are the values resulting from practical assessment of the valve parameters and regime. The acting force has been taken as having the form of consecutive "distorted sinusoidal pulses" $A(\tau)$ with linear variation of amplitude and initial phase. Thus $A(\tau)$ had the form of

$$A(\tau) = \begin{cases} 0{,}08(\tau+3)\cdot\sin[\tau(0{,}8+0{,}02\tau)], & 0<\tau<\tau_\kappa, \\ 0, & \begin{cases}\tau<0,\\ \tau>\tau_\kappa,\end{cases} \end{cases} \quad (4)$$

where τ_k is determined and again from an arbitrary and logical condition $(0.8 + 0.02\,\tau_k)\tau_k = 2k\pi$, so that when $A(\tau_k) = 0$, $\tau = \tau_k$, $k = 1, 2, 3, 4, 5$ so that $\tau_1 = 6.724$, $\tau_2 = 12.067$, $\tau_3 = 16.640$, $\tau_4 = 20.$[illegible]2, $\tau_5 = 24.394$. The analysis has shown that to a great degree of accuracy the amplitude and phase of the oscillator may be said to be established towards the end of the pulse disturbance; between the pulses the oscillations may be assumed to be harmonic and

$$\left.\begin{aligned} x &= x_m \cos(\tau - \varphi_n) \\ \frac{dx}{d\tau} &= -x_m \sin(\tau - \varphi_n) \\ x_m &= \sqrt{x^2 + \left(\frac{dx}{d\tau}\right)^2} \\ \varphi_n &= \tau + \operatorname{arc\,tg} \frac{dx/d\tau}{x} \end{aligned}\right\} \qquad (5)$$

✗

hold, where φ_n - the initial oscillator phase until the arrival of

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the (n + 1)-th pulse. The evaluations were made on a fast electronic computer, Eq. (3) being integrated by the Runge-Kutta method. The results obtained are given in Table 1 and show that the phase φ_n depends little on μ and γ, γ determining only the number of pulses required for attaining phase φ_n (γ characterizes the external force acting on the oscillator). The obtained values φ_n were compared with the phase Ψ of the fundamental of the sequence of pulses $A(\tau)$ and the results are given in Table 2. Finally, if the force acting on the oscillator has the form of bursts of oscillations, whose amplitude and detuning are small and slowly varying, the steady state phase of the oscillator may be determined by the method of P.N. Zanadvorov (Ref. 1: Radiotekhnika, v. 3, no. 2, 1958). There are 2 tables, and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: P.W. Fraser, PIRE, v. 45, no. 9, 1957. X

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The effect of complex shape ...

ASSOCIATION: Nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi im. A.S. Popova (Scientific and Technical Society of Radio Engineering and Electrical Communications im. A.S. Popov) [Abstractor's note: Name of Associatiation taken from 1st page of journal]

SUBMITTED: January 5, 1961

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MAKAROV, G.I.

6

V.A. FOK L.A. VAYNSHTEYN

a. VA Fock and LA Vainstein - 'Cross-Sectional Diffusion in Short-Wave Diffraction on Convex Cylinder.'

A.L. MIKHAELYAN

b. AL Michaelyian - 'Phenomenon of Interconnection of Magnetized Ferrite Patterns.'

c. BZ Katsenelenbaum - 'Diffraction on Wide Aperture in Wide-Wave Guide.'

d. YaA Monosov - 'On Theory of Parametric Resonance in Ferrites on UHF.'

GI Makarov - "The Propagation of Electromagnetic Waves in Smooth Ionospheric Layers."

reports to be submitted for the Intl. Symposium on Electromagnetic Theory and Antennas, Copenhagen, Denmark, June 1962.

MAKAROV, G.I.

Structure of solutions of standard equations for ionospheric layers. Probl.dif.i raspr.voln. 1:5-23 '62. (MIRA 15:6)
(Ionospheric radio wave propagation)

GYURMINEN, E.M.; MAKAROV, G.I.

Asymptotic representations of Whittaker functions. Probl.dif.i raspr.voln. 1:24-62 '62. (MIRA 15:6)
(Ionospheric radio wave propagation)
(Functions, Hypergeometric)

MAKAROV, G.I.

Asymptotic representations of solutions to Maxwell's equations in smooth ionospheric layers. Probl.dif.i raspr.voln. 1:63-95 '62.
(MIRA 15:6)

(Ionospheric radio wave propagation) (Electromagnetic theory)

S/754/62/C00/001/001/006

AUTHOR: Makarov, G. I., Novikov, V. V.

TITLE: Propagation of electromagnetic wave above a surface with arbitrary surface impedance

PERIODICAL: Leningrad. Universitet. Problemy difraktsii i rasprostraneniya voln. no 1. 1962. Rasprostraneniye radiovoln. 96-115.

TEXT: The propagation of radiowaves above an earth having a layered structure is considered, with a particular aim at determining the field at distances not exceeding 100—150 km from the antenna. Problems of this type are of great practical significance in connection with radio navigation and geological prospecting. In view of the mathematical difficulties involved in a rigorous solution of such problems, it becomes necessary to use the concept of surface impedance as an approximation for the boundary conditions. The author derives power-law and asymptotic expansions for an approximate solution of the problem, and in addition determines the errors resulting from the use of the surface-impedance method. Certain data on the structure of the electromagnetic field above a plane surface having a definite

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surface impedance are also given.

The author reduces Maxwell's equations for the field quantities to a scalar wave equation for the vector potential

$$\vec{A} = A\vec{e}_z,$$

$$\frac{\partial^2 A}{\partial z^2} + \frac{\partial^2 A}{\partial r^2} + \frac{1}{r}\frac{\partial A}{\partial r} + k^2 A = -j, \qquad (9)$$

and obtains ultimately the equation in the form $A = I_2 + I_2$, where

$$J_2 = -\pi k\delta H_0^{(1)}\left(kr\sqrt{1-\delta^2}\right). \qquad (29)$$

and

$$J_1 = \frac{2e^{jkr}}{r}\left\{1 + \sum_{m=0}^{\infty}\frac{\delta^{2(m+1)}}{(2m+1)!!}Q_{m+1}(kr)\right\}, \qquad (35)$$

or

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Propagation of electromagnetic wave . . .

$$I_1 = \frac{2e^{ikr}}{r} \sum_{m=0}^{\infty} y_m (2s_1 r)\, \vartheta^{2m}, \tag{37}$$

with

$$Q_{m+1}(x) = x^{m+1} \sqrt{\frac{\pi x}{2}}\, H^{(1)}_{m+\frac{1}{2}}(x)\, e^{-ix}, \tag{38}$$

$$s_1 = \frac{ik\delta^2}{2}; \tag{38}$$

$$y_0(x) = 1 + \sum_{k=1}^{\infty} \frac{(-)^k x^k}{(2k-1)!!} = 1 - 2\sqrt{\frac{x}{2}}\, e^{-\frac{x}{2}} \int_0^{\sqrt{\frac{x}{2}}} e^{z^2} dz; \tag{39}$$

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$$y_m(x) = \frac{1}{2^m m!} \sum_{k=1}^{\infty} \frac{(-)^k k(k+1)\ldots(k+2m-1)}{(2k+2m-1)!!} x^k \tag{40}$$

The expansions (35) and (37) are power series which may converge slowly, in which case the asymptotic expressions

$$A \sim -\frac{2e^{ikr}}{r} \sum_{n=1}^{\infty} \frac{n!\,i^n P_n\left(\frac{1}{\delta}\right)}{(2s_1 r)^n}. \tag{49}$$

and

$$A = -2\pi k\delta H_0^{(1)}\left(kr\sqrt{1-\delta^2}\right) \cdot 2k\delta \int_{kr}^{\infty} e^{i\rho} d\rho \frac{1}{\sqrt{\rho^2 - k^2 r^2 (1-\delta^2)}}. \tag{51}$$

are more suitable.

From the potential it is easy to determine the vertical component of the electric vector

E_z, namely

$$E_z = i\omega\mu \frac{2e^{ikr}}{r} W(r), \tag{63}$$

where

$$W(r) = (1-\delta^2) A \frac{re^{-ikr}}{2} - \frac{1}{ikr} + \frac{1}{(ikr)^2}. \tag{64}$$

The approximate expression for E_z has the form

$$E_z = i\omega\mu \frac{2e^{ikr}}{r} \left\{(1-\delta^2) w(r) - \frac{1}{ikr} + \frac{1}{(ikr)^2}\right\}, \tag{65}$$

which can be readily evaluated with the aid of tables of the probability integral.

There are six figures and twenty references. The latest English-language references are: J. R. Wait, J. Res. NBS, 59 December 1957; J. R. Wait, IRE Trans. AP-1, 1953, 9 and AP-2, 1954, 144; J. R. Wait, Geophysics, 18, April 1953, 416; P. C. Clemmow, Phil. Trans. Roy. Soc. June 1953, 1-55.

MAKAROV, G.I.

Field of a point source in an infinite ionized layer. Probl. dif.i raspr. voln 2:81-101 '62. (MIRA 16:4)
(Dipole moments) (Electromagnetic waves)

S/046/62/008/001/006/018
B125/B102

AUTHORS: Kozina, O. G., Makarov, G. I.

TITLE: Transition processes in the acoustic fields of piston membranes of different concrete shapes

PERIODICAL: Akusticheskiy zhurnal, v. 8, no. 1, 67 - 71 1962

TEXT: The transition processes in an acoustic field for circular, quadratic, and triangular membranes are studied by the authors' own theoretical methods (Akust. zh., 1961, 7, 1, 53 - 58). For a circular diaphragm the point of observation is either outside the cylinder whose basal plane lies on the membrane or on the axis of this cylinder. In the former case the equations of the fore and rear fronts are $ct_\delta = \sqrt{z^2 + (x-a)^2}$ (3) and $ct_\Delta = \sqrt{z^2 + (x + a)^2}$, respectively. The field of a circular membrane is

$$P_1 = \frac{\rho c}{\sqrt{2\pi}} \sqrt{\frac{a}{x}} \frac{ct_\delta}{x-a} \frac{1}{\sqrt{\omega t_\delta}} N\left(2\sqrt{\frac{c\Delta t_\delta}{\lambda}}\right) \sin\left[\omega\Delta t_\delta - \xi\left(2\sqrt{\frac{c\Delta t_\delta}{\lambda}}\right)\right]. \quad (8)$$

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The separation of the first half-wave from the one following is characteristic of the lateral fields of membranes of any shape. The pressure in the lateral field is $P_1 - P_2$ where P_2 is

$$P_2 = \frac{\rho c}{\sqrt{\pi}} \sqrt{\frac{a}{x}} \frac{ct_\beta}{x+a} \frac{1}{\sqrt{\omega t_\beta}} A\left(2\sqrt{\frac{c\Delta t_\beta}{\lambda}}\right) \sin\left[\omega \Delta t_\beta + \varphi\left(2\sqrt{\frac{c\Delta t_\beta}{\lambda}}\right)\right],$$

$$A(x) = \sqrt{1 + N^2 - 2N\cos\left(\xi - \frac{\pi}{4}\right)}$$

$$\varphi = \operatorname{arctg}\frac{\frac{1}{\sqrt{2}} - N\sin\xi}{\frac{1}{\sqrt{2}} - N\cos\xi},$$

At P_1 and P_2 $N(x) = \sqrt{2}\sqrt{C^2(x) + S^2(x)}$, $\xi(x) = \operatorname{arctg}(S(x)/C(x))$ and Δt_β is the distance of the point of observation from the rear front. The stationary diagram is formed in the neighborhood of the rear front. If the normal component $U_z(t)$ of the velocity is given,

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$P = \varrho c\left[U(t - \frac{z}{c}) - U(t - \frac{\sqrt{z^2 + a^2}}{c})\right]$ (13). The pressure change on the membrane axis corresponding to $U_2(t) = 1$, $t > 0$; $U_2(t) = 0$, $t < 0$ is illustrated in Fig. 5. If the membrane is excited according to $U_2(t) = \sin\omega t$, $t > 0$, $U_2(t) = 0$, $t < 0$ (5) two waves occur with a phase difference $\Delta t \approx a^2/2zc$ which decreases as the distance from the membrane increases. These considerations are valid for the greater part also for processes in sonic fields of membranes with contours not describable by analytic functions. For quadratic membranes only the sources at the sides dl and gf produce a considerable field strength at the point of observation. The corresponding transition process is in agreement with the corresponding process of a circular membrane. The main difference between the processes in circular and quadratic membranes is observed in the neighborhood of the rear front of the disturbance. The calculation methods hitherto mentioned can be used also for triangular membranes. Only that side of the triangle directed to the point of observation contributes to the transition process. In the stationary and nonstationary case regions with weak sonic fields occur. There are 8 figures and 2 Soviet references.

Transition processes in the...

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ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: June 11, 1960

Fig. 5

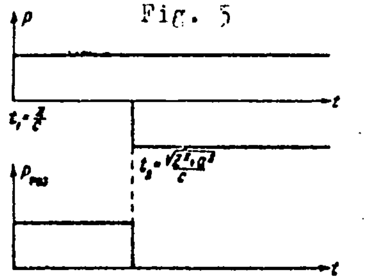
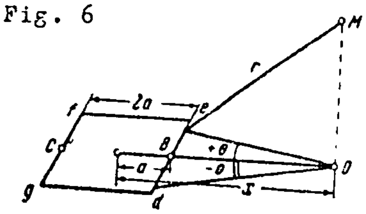


Fig. 6



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S/046/62/008/001/007/018
B125/B102

AUTHORS: Kozina, O. G., Makarov, G. I., Shaposhnikov, N. N.

TITLE: Transition processes in acoustic fields arising on the oscillation of a spherical segment

PERIODICAL: Akusticheskiy zhurnal, v. 8, no. 1, 1962, 72 - 78

TEXT: The authors consider a sphere of radius R with one or two spherical segments (divergence angle Θ_0) which is placed in an unbounded liquid medium of the density ϱ and the sound speed c. The wave equation of the segments oscillating like a membrane has the solution

$$P_1 = \sum_{n=0}^{\infty} D_{2n}(r,t)\,[P_{2n-1}(\cos\theta_0) - P_{2n+1}(\cos\theta_0)]\,P_{2n}(\cos\theta), \quad (3)$$

$$P_2 = \sum_{n=0}^{\infty} D_{2n+1}(r,t)\,[P_{2n}(\cos\theta_0) - P_{2n+2}(\cos\theta_0)]\,P_{2n+1}(\cos\theta), \quad (4)$$

$$P_3 = \sum_{n=0}^{\infty} \frac{1}{2} D_n(r,t)\,[P_{n-1}(\cos\theta_0) - P_{n+1}(\cos\theta_0)]\,P_n(\cos\theta), \quad (5)$$

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Transition processes in...

if the initial conditions

$$U_r|_{r=R} = \begin{cases} f(t), & 0 \leqslant \theta \leqslant \theta_0 \\ 0, & \theta_0 \leqslant \theta \leqslant \pi - \theta_0 \\ \pm f(t), & \pi - \theta_0 \leqslant \theta \leqslant \pi, \end{cases} \quad (1)$$

for two segments oscillating in the same phase (plus sign) or the opposite phase (minus sign) and

$$U_{|r=R} = \begin{cases} f(t), & 0 \leqslant \theta \leqslant \theta_0 \\ 0, & \theta_0 \leqslant \theta \leqslant \pi. \end{cases} \quad (2)$$

for a unilaterally oscillating segment are taken into account. $P_n(\cos\theta)$ are Legendre polynomials and U_r is the radial component of the membrane velocity. f(s) is the spectrum of the signal (1). The radial part D_ν is a spherical wave with the fore front $ct = \nu - R$ and the entire solution consists of a superposition of spherical waves. In the neighborhood of the wave fronts formula

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$$P = \frac{\rho c}{\pi}\frac{R}{r}\sqrt{\frac{\sin 2\alpha\cos\beta}{\sin\theta}}\sqrt{\frac{R}{ct}}\int_0^{\theta_0}\frac{\sin\varphi}{\sqrt{\cos\varphi-\cos\theta_0}}\sum_{n=n_0}^{\infty}\frac{\sin\left[\left(2n+\frac{1}{2}\right)X(\varphi)\right]}{2n+\frac{1}{2}} + \sum_{n=n_0}^{\infty}\frac{\sin\left[\left(2n+\frac{1}{2}\right)Y(\varphi)\right]}{2n+\frac{1}{2}} + \sum_{n=n_0}^{\infty}\frac{\cos\left[\left(2n+\frac{1}{2}\right)V(\varphi)\right]}{2n+\frac{1}{2}} - \sum_{n=n_0}^{\infty}\frac{\cos\left[\left(2n+\frac{1}{2}\right)W(\varphi)\right]}{2n+\frac{1}{2}}, \quad (12)$$

with $X(\varphi) = \varphi - \theta + \Omega$, $Y(\varphi) = \varphi + \theta - \Omega$, $V(\varphi) = \varphi - \theta - \Omega$, $W(\varphi) = \varphi + \theta + \Omega$ is obtained for the segments oscillating in the same phase with the aid of the asymptotic estimations of G. I. Petrashen' and G. I. Makarov (Uch. zap. LGU, 1953, 27, 170, 266). The significance of the angles Ω, α, β appears from Fig. 3. Analogous formulas are valid for the segments oscillating in the opposite phase and for unilaterally radiating segments. If the circumference of the sphere is an integral multiple of the wavelength, resonance occurs. The segments oscillating in phase have more resonant frequencies. The fields of the three types of radiators characterized by the boundary conditions (1) and (2) consist of a region of geometrical

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transition processes and a region of the diffraction transition processes according to the type of the transition processes. All wave fronts lie exclusively in the region of the geometrical transition processes. The free oscillations in the fields of the three types of radiators have different frequencies in the diffraction region. The region of the geometrical transition processes is similar to that of the transition processes studied earlier. Owing to the diffraction transition processes which occur as a result of mechanical bending the transition process gradually tends to zero only asymptotically. In plane piston-type membranes in an infinitely rigid screen the transition processes are finite with respect to time. There are 4 figures and 4 Soviet references.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: January 3, 1961

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S/754/62/000/001/003/006

AUTHOR: Gyunninen, E. M., Makarov, G. I.

TITLE: Propagation of electromagnetic pulse above a spherical earth

PERIODICAL: Leningrad. Universitet. Problemy difraktsii i rasprostraneniya voln. no 1. 1962. Rasprostraneniye radiovoln. 133-142.

TEXT: The curvature of the earth and its finite conductivity cause the waveform of an electromagnetic pulse to vary during the course of propagation, and the dependence of this variation on the character of the path is of great theoretical and practical interest. Previous treatments of the problem were made under highly simplifying assumptions.

In this article the formal solution of the problem of the propagation from a dipole carrying a sinusoidal current turned on at the instant $t = 0$ is evaluated numerically (with a high speed digital computer) and the results obtained are compared with the accumulated numerical data of the stationary theory of radiowave diffraction around the spherical earth in the shadow region. This gives a sufficiently good idea of the extent to which the primary pulse becomes distorted during the course of its propagation. The time variation of the field is investigated

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for different types of ground, for different sources to the source, and for different pulse carrier frequencies. Real and also perfectly conducting ground is considered, so that the purely geometrical factor of the earth's curvature can be taken into account.

There is one table and five figures. A. V. Manankov and Yu. I. Kyullenen participated in the calculations. Of the twelve references, the latest English-language ones are by: J. R. Wait (Canad. J. Phys. 35, 1957, 1146; J. R. Johler, L. C. Walters, IRE Trans., AP-7, 1959, No. 1; J. R. Johler, W. J. Keller, and L. C. Walters, National Bureau of Standards, 1956; J. B. Keller and R. M. Lewis, IRE Trans. AP-6, 1958, No. 1.

MAKAROV, G.I.

Propagation of plane electromagnetic waves in ionospheric layers containing a complex turning point. Probl.dif.i raspr. voln 2:62-80 '62. (MIRA 16:4)
(Ionospheric radio wave propagation)

MAKAROV, G.I.

Propagation of plane electromagnetic waves in a symmetrical ionospheric layer. Probl.dif.i raspr. voln 2:39-61 '62. (MIRA 16:4)
(Ionospheric radio wave propagation)

GYUNNINEN, E.M.; MAKAROV, G.I.; NOVIKOV, V.V.; RYBACHEK, S.T.

Propagation of an electromagnetic pulse over the earth's surface.
Probl.dif.i raspr. voln 2:132-143 '62. (MIRA 16:4)
(Electromagnetic waves) (Dipole moments)

GYUNNINEN, E.M.; MAKAROV, G.I.; YAGUPOV, I.G.; YANEVICH, Yu.M.

Effect of surface obstructions on the propagation of radio waves. Probl.dif.i raspr.voln 2:166-211 '62. (MIRA 16:4)
(Electromagnetic waves) (Diffraction)

BREUSOV, O.N.; REVZIN, G.Ye.; LESHCHENKO, V.V.; ZELENTSOV, D.P.; DERBIN, M.M.; VERNEDUBOV, N.P.; MAKAROV, G.I.

Obtaining analytically pure tellurium by the zone melting method and reprocessing of its wastes to tellurium compounds of pure reaction. Prom.khim.reak. i osobo chist.veshch. no.2:54-60 '63. (MIRA 17:2)

KOZINA, O.G.; YANEVICH, Yu.M.; FILIPPOV, K.F.; BULGAKOV, A.K.; MAKAROV, G.I., otv. red.; LALAYANTS, E.A., red.; ZHUKOVA, Ye.G., tekhn. red.

[Laboratory work on linear systems] Laboratornye raboty po lineinym sistemam. Leningrad, 1963. 168 p. (MIRA 16:9)

1. Leningrad. Universitet. Fizicheskiy fakul'tet.
(Electric engineering--Laboratory manuals)
(Electronic circuits)

ACC NR: AT6026767

the other spherical model. However, the phase velocity is smaller along the surface of the spherical model. For low altitudes, the field has the aspect of a heterogenous wave and increases exponentially with altitude, which is taken perpendicularly to the surface of the sphere. In the case of the flat model, the field decreases as the altitude increases. At high altitudes, the field oscillates with the height in both models. Orig. art. has: 2 figures, 38 formulas.

SUB CODE: 09,17/ SUBM DATE: none/ ORIG REF: 002

ACC NR: AT6026767 SOURCE CODE: UR/2754/66/000/005/0051/0061

AUTHOR: Makarov, G. I.; Novikov, V. V.

ORG: none

TITLE: Certain properties of normal waves in the problem of the propagation of radio waves in the earth-ionosphere waveguide channel

SOURCE: Leningrad. Universitet. Problemy difraktsii i rasprostraneniya voln, no. 5, 1966. Rasprostraneniye radiovoln (Radio wave propagation), no. 4, 51-61

TOPIC TAGS: radio wave propagation, ionospheric propagation, ionospheric radio wave, waveguide

ABSTRACT: The purpose of the investigation was to clarify complications that result from the curvature of the earth, the curvature of the ionosphere, or that involve the determination of the boundary between the two. It is assumed that such a boundary is flat. Three models are considered: one is flat and two are spherical. One of the spherical models is the Grinberg model with an interphase boundary possessing dielectric penetrability. Comparing these models, the authors arrive at the following conclusions: Assuming the frequency remains the same, the phase velocity is larger in the Grinberg model than in the flat one. Both exceed the velocity of light at all but 0 frequencies. Phase velocities are the same for the flat model and along the axis of

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APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001032410010-9"

ACC NR: AT6026769 SOURCE CODE: UR/2754/66/000/005/0071/0084

AUTHOR: Bezruchenko, L. I.; Makarov, G. I.

ORG: none

TITLE: Propagation of a pulse signal in the Epstein ionospheric layer

SOURCE: Leningrad. Universitet. Problemy difraktsii i rasprostraneniya voln, no. 5, 1966. Rasprostraneniye radiovoln (Radio wave propagation), no. 4, 71-84

TOPIC TAGS: signal propagation, ionospheric propagation, ionospheric electron density, ionospheric radio wave

ABSTRACT: The Epstein model of the ionosphere was used in the present study because large gradients in the dielectric constant are permissible and a unique solution can be obtained for the field over the entire region. The existence of an exact solution is shown for the problem of the propagation of a pulsed signal in an Epstein ionosphere, assuming that electron concentration is a continuous function of altitude. The effect of damping due to collisions is discussed briefly. The material of this article is part of a dissertation by L. I. Bezruchenko under the direction of G. I. Makarov. Orig. art. has: 1 figure, 51 formulas.

SUB CODE: 20,04,17/ SUBM DATE: none/ ORIG REF: 005/ OTH REF: 007

Card 1/1

ACCESSION NR: AT4043150 S/2754/64/000/003/0192/0201

AUTHOR: Gavrilova, N. S.; Loginova, O. N.; Makarov, G. I.

TITLE: Calculation of the reflection coefficient of a smooth heterogeneous layer

SOURCE: Leningrad. Universitet. Problemy* difraktsii i rasprostraneniya voln, no. 3, 1964. Rasprostraneniye radiovoln (Radio wave propagation), no. 3, 192-201

TOPIC TAGS: radio wave, radio wave propagation, radio wave reflection, reflection coefficient

ABSTRACT: This article is a continuation of the authors' previous work in which they derived the asymptotic forms of solutions of Maxwell's equations, applicable to the propagation of radio waves in an unbounded, smooth layer. In this work, the numerical integration of Maxwell's equations for a heterogeneous layer is performed and the resulting values of the reflection coefficient are compared with the values obtained from asymptotic solutions and solutions of the W.K.B. type as described by L. M. Brekhovskikh. The dielectric

ACCESSION NR: AT4043150

constant is assumed to be uniform up to an altitude Z_{cr} after which it is assumed to vary with altitude and frequency

$$1 - \frac{CP_n(z)}{f(f + i\frac{\nu}{2\pi})},$$

where $P_n(z)$ is a third degree polynomial approximation of the electron concentration for $z \leqslant 100$km. The results of asymptotic computations are shown in Figure 1 of the Enclosure. Numerical integration is used to evaluate the normalized wave admittance $\tilde{A}$, from which the reflection coefficient for various angles of incidence is obtained using the standard formula. The computation was performed on a "Strela" computer using the fourth-order accuracy Runge-Kutta formula with automatic step selection. Selection of an optimum integration interval and of proper initial conditions resulted in an overall relative error in $\tilde{A}$ of 10^{-3}. Figure 2 of the Enclosure shows the results of numerical integration while Figures 3 and 4 give a comparison of the 3 methods. Orig. art. has: 16 equations, 1 table, and 8 figures.

ASSOCIATION: Leningradskiy universitet (Leningrad University)

1. VOKHOMSKIY, N. S., Engr., MARKAROV, I. S.

2. SSSR (600)

4. Metals-Heat Treatment

7. Hardening of parts for blacksmith-shop equipment with oxy-acetylene flame.
Vest. mash. 32 No. 8, 1952

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

MARKAROV, L.I.

Using ultrahigh-speed cinematography for studying the mechanization of tea leaf picking. Usp.nauch.fot. 6:206 '59. (MIRA 13:6)
(Tea machinery) (Motion pictures in agriculture)

MARKAROV, N.A., inzh.

Stress losses in reinforcements of construction elements made of sandy concretes. Bet. i zhel.-bet. no.3:121-125 Mr '60.
(MIRA 13:6)

(Prestresses concrete)

BERDICHEVSKIY, G.I., kand.tekhn.nauk; MARKAROV, N.A.,inzh.

Taking into account the time factor in determining stress losses due to the creep of concrete. Bet. i zhel.-bet. no.9:408-412 S'60. (MIRA 13:9)

(Prestressed concrete) (Strains and stresses)

MARKAROV, N. A.

Cand Tech Sci - (diss) "Study of loss due to creep and shrinkage in pre-stressed elements reinforced with high-strength wire armoring having a periodic profile." Moscow, 1961. 18 pp with diagrams; (Ministry of Higher and Secondary Specialist Education RSFSR, Moscow Order of Labor Red Banner Construction Engineering Inst imeni V. V. Kuybyshev); 180 copies; price not given; (KL, 6-61 sup, 221)

MIKHAYLOV, V.V., prof.; MARKAROV, N.A., inzh.

Improving methods of calculating stress losses from creep and shrinkage. Bet. i zhel.-bet. no.4:156-161 Ap '61. (MIRA 14:6)

1. Deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR (for Mikhaylov).

(Prestressed concrete)

MARKAROV, ~~N.A., inzh.~~

Study of tension loss from creep and contraction in prestressed elements reinforced with high-strength wire with periodic profile. Trudy NIIZHB no.24:216-253 '61. (MIRA 15:5)
(Prestressed concrete construction)

MARKAROV, P.G., ordinator

Regional novocaine block in certain eye diseases. Oft.zhur. 13 no.3:173-175 '58 (MIRA 11:6)

1. Iz kafedry glaznykh bolezney (zav. - prof. M.A. Dmitriyev) Krasnoyarskogo meditsinskogo instituta.
(EYE--DISEASES AND DEFECTS)
(NOVOCAINE)

1. MARKAROV, P. V.

2. USSR (600)

4. Cells

7. Critical analysis of reduction division; experimental-morphological investigation of spermatogenous cells in Amphibia, Arkhiv. anat. gist. iembr., 29, No. 1, 1952.

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001032410010-9"

MARKAROV, P.V. (Leningrad, K-112, Novocherkasskiy prospekt, 40, kv.4)

Quantitative study of frog oocytes with regard to some morphological and cytochemical problems. Arkh. anat., gist. i embr. 44 no.6:21-29 Je '63. (MIRA 17:7)

1. Kafedra anatomii i gistologii (zav. - chlen-korrespondent AMN SSSR prof. P.V. Makarov) Leningradskogo gosudarstvennogo ordena Lenina universiteta.

Markarov, S.

92-2-20/37

AUTHOR: Markarov, S.G., Chief of a Petroleum Production Section

TITLE: Wellhead Sampling Thief for Petroleum, Water and Gas (Ust'yevoy probootbornik dlya nefti, vody i gaza)

PERIODICAL: Neftyanik, 1958, Nr 2, p 20 (USSR)

ABSTRACT: The author states that N. R. Golyakov, an operator at the seventh oil field of the Ordzhonokidzeneft' Petroleum Production Administration, proposed the use of a wellhead thief of very simple design for sampling petroleum, water and gas. It is a vertical cylinder 550 mm long of 3-4 liter capacity, and equipped with a measuring glass tube. Petroleum, water and gas enter the thief which separates the necessary sample and drains it through special tubes. The sampling operation is carried out without disrupting the operation of the oil well. The suggestion of N.R. Golyakov has been accepted and his method introduced in oil fields of the Ordzhonikidzeneft' Petroleum Production Administration. There is one sketch showing the sampling thief.

ASSOCIATION: Sed'moy promysel NPU Ordzhonikidzeneft' (Seventh Oil field of the Ordzhonikidzeneft' Petroleum Administration)

AVAILABLE: Library of Congress

Card 1/1

MARKAROV, S.G.

Automatic control of oil fields. Neftianik 5 no.11:19-20
N '60. (MIRA 13:11)

1. Glavnyy inzhener proyekta NIPINeftekhimavtomat.
(Oil fields) (Automatic control)

MARKAROV, S., inzh. (Baku)

Oil injection as oil production method. Tekh.mol. 28 no.10:36b '60. (MIRA 13:10)

(Baku--Oil fields--Production methods)

MARKAROV, S.G.

Efficient reorganization of oil production in connection with automation. Neft.khoz. 38 no.8:1-6 Ag '60. (MIRA 13:8)
(Oil fields—Production methods)
(Automatic control)

MARKAROV, S.G.

Planning general automatic control systems for oil-field installations. Mash. i neft. obor. no.8:25-27 '65. (MIRA 18:9)

1. Nauchno-issledovatel'skiy i proyektnyy institut po kompleksnoy avtomatizatsii proizvodstvennykh protsessov v neftyanoy i khimicheskoy promyshlennosti.

MANDZHGALADZE, R.N.; VASHAKIDZE, V.I.; MARKAROVA, S.S.; KASHI..., ...

Some clinical and experimental data on the toxic properties of potassium permanganate. Soob. AN Gruz. SSR 36 no.3:...-... ...
(MIRA 18:3)

1. Institut gigiyeny truda i professional'nykh zabolevaniy im. N.G. Makhviladze Ministerstva zdravookhraneniya GruzSSR. Submitted May 29, 1964.

SHAVKUNOV, A.V., inzh.; AKSENOV, N.A., inzh.: MUGORMAN, Yu. N., inzh.; KOLCHINSKIY, V.I., inzh.; Prinimali uchastiye: KORNEYEVA, M.P., inzh; CHERNOV, V.I., inzh.; MARKAROV, S.Ye., inzh.; SAYMUKOVA, Ye.P., inzh; LUKASH, B.K., starshiy master; TITOV, S.A., svarshchik; BEREZOVSKIY, V.A.

Welding titanium alloys in chambers with a controlled atmosphere. Svar. proizv. no.4:24-25 Ap'61. (MIRA 14:3)
(Titanium alloys- Welding) (Proctective atmospheres)

MARKAROVA, O.S.

Function of the thyroid gland and of the ovaries in patients with climacteric syndrome. Soob. AN Gruz. SSR 34 no.1:205-212 AP '64 (MIRA 17:8)

1. Nauchno-issledovatel'skiy institut akusherstva i ginekologii AN Gruzinskoy SSR. Predstavleno akademikom K.D.Eristavi.

Markovsky

AVANESOVA, A.M., kand.tekhn.nauk; KARPENKO, M.M., kand.tekhn.nauk; PROTASOV, G.N., kand.tekhn.nauk; ASKEROV, A.G., inzh.; MARKAROVA, T.A., inzh.; SAVEL'YEVA, T.A., inzh.; DASHDAMIROV, F.A., inzh.; TARIVERDIYEV, D.A., inzh.

Sinking the N 80 deep exploratory well in the Pirsagat sector. Trudy AzNII DN no.5:78-100 '57. (MIRA 12:4)
(Pirsagat region--Boring)

MARKAROVA, T.A.; DEDUSENKO, G.Ya.

Electrophoresis in weighted drilling muds. Azerb.neft.khoz. 36 no.8:11-14 Ag '57. (MIRA 10:11)
(Electrophoresis) (Oil well drilling fluids)